

Journal of Advanced Research in Fluid Mechanics and Thermal Sciences
Volume 57, Issue 2, 1 May 2019, Pages 141-147

Enhancement of biogas production from sewage sludge by biofilm pretreatment method (Article)

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Abstract

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Since the last two decades, different pre-treatment methods have been proposed to enhance the yield of biogas production from sewage sludge. In order to improve the biogas yield and to find an alternative and economically suitable pre-treatment method, a biological pre-treatment method using a biofilm was studied. The biofilm constituted of four strains of bacteria producing hydrolases was used as an immobilized biocatalyst for the pre-treatment of the sludge. Based on the data obtained during this study, the optimum biofilm was formed within 2 days. The best amount of granular activated carbon (GAC) that has given an optimum biofilm was 4g. An improvement of 16.9% on the ratio of soluble chemical oxygen demand (SCOD) / total chemical oxygen demand (TCOD) and 28.3% in the volatile solids (VS) was achieved after 12 hours of pre-treatment at room temperature (30 ± 2°C). Comparing to the no pre-treated sludge (control), an increase of 15% in the cumulative biogas production was observed after 14 days of digestion with 30% v/v of inoculum (anaerobic sludge) at 37°C and 25 days of HRT. It can be concluded that the developed pre-treatment method can be used for the enhancement of the biogas production from sewage sludge at mesophilic temperature range. © 2019, Penerbit Akademia Baru.

Author keywords

Biofilm Biogas Granular Activated Carbon (GAC) Pretreatment Sewage Sludge

ISSN: 22897879
Source Type: Journal
Original language: English

Document Type: Article
Publisher: Penerbit Akademia Baru

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